AMENDED CLAIMS

1. A plasma-spraying device for spraying a powdered material, comprising electrodes (1), which form a plasma channel (2) having an inlet end (3) and an outlet end (4), and a means (5) for supplying said powdered material to said plasma channel (2), wherein said powder supply means (5) is arranged between a first section (6) of said electrodes (1) located upstream of the means (5) and a second section (7) of said electrodes (1) located downstream of the means (5), as seen in the direction of plasma flow of the plasma channel (2) characterised in that the diameter of the plasma channel (2) in at least one section (8) is greater than the diameter of the plasma channel (2) in each section (6, 7) located upstream of said section (8).

2. A plasma-spraying device for spraying a powdered material, comprising electrodes (1), which form a plasma channel (2) having an inlet end (3) and an outlet end (4), and a means (5) for supplying said powdered material to said plasma channel (2), wherein said powder supply means (5) is arranged between a first section (6) of said electrodes (1) located upstream of the means (5) and a second section (7) of said electrodes (1) located downstream of the means (5), as seen in the direction of plasma flow of the plasma channel (2) characterised in that at least in one section (6, 7, 8), the length of the furthest upstream electrode equals the diameter of the plasma channel (2) in this electrode.

3. A plasma-spraying device as claimed in claim 1 or 2, in which at least one of the following parameters is different between said first and second sections (6, 7): the length of the section, the number of electrodes (1) in the section (6, 7) and the geometry of the plasma channel (2) in the section (6, 7).

4. A plasma-spraying device as claimed in any one of the preceding claims, in which an additional powder supply means (9) is arranged between a third section (8) of electrodes (1) and one of said first and second sections (6, 7).

5. A plasma-spraying device as claimed in any one of the preceding claims, in which a plurality of powder supply means (5, 9) are provided, each of said powder supply means (5, 9) being arranged between a section of said electrodes located upstream of the means (6, 7) and a section of said electrodes located downstream (7, 8) of the means (5, 9).

6. A plasma-spraying device as claimed in any one of the preceding claims, in which the number of electrodes (1) in at least one section (6, 7, 8) is at least two.

7. A plasma-spraying device as claimed in claim 6, in which the number of electrodes (1) in the section (6) closest to said inlet end (3) of the plasma channel (2) is at least two.

8. A plasma-spraying device as claimed in any one of the preceding claims, in which the powder supply means (5, 9) forms a space (10) for supplying powder at an angle to a centre axis of the plasma channel (2).

9. A plasma-spraying device as claimed in claim 8, in which said space (10) is formed by a projection (11) on the electrode (1) closest upstream of the means (5, 9), which is arranged at a distance from a recess (12) in the electrode (1) closest downstream of the means (5, 9).

10. A plasma-spraying device as claimed in claim 9, in which said projection (11) is conical and makes an angle ($\alpha$) with the centre axis of the plasma channel (2).

11. A plasma-spraying device as claimed in claim 10, in which said angle ($\alpha$) is 15-25°.

12. A plasma-spraying device as claimed in any one of claims 9-11, in which said recess (12) is conical and makes an angle ($\beta$) with the centre axis of the plasma channel (2).

13. A plasma-spraying device as claimed in claim 12, in which said angle ($\beta$) is 17-30°.

14. A plasma-spraying device as claimed in claims 10 and 12, in which the difference between said angle of the recess (12) and said angle of the projection (11) ($\beta$-$\alpha$) is 1.5° to 5°.

15. A plasma-spraying device as claimed in any one of the preceding claims, in which the powder supply means (5, 9) comprises openings (13) that are oriented at an angle to the centre axis of the plasma channel (2) to obtain a tangential powder supply.

16. A plasma-spraying device as claimed in any one of the preceding claims, in which the diameter of the plasma channel (2) in one section (7) is greater than the diameter of the plasma channel (2) in the section located upstream (6) of said section (7).

17. A plasma-spraying device as claimed in any of the claims 2 to 16, in which the diameter of the plasma channel (2) in at least one section (8) is greater than the diameter of the plasma channel (2) in each section (6, 7) located upstream of said section (8).

18. A plasma-spraying device as claimed in any one of the preceding claims, in which the length of the electrodes (1) is increased by their distance from the inlet end (3) of the plasma channel (2).

19. A plasma-spraying device as claimed in any of the claims 1, 3 to 18, in which, at least in one section (6, 7, 8), the length of the furthest upstream electrode (1) equals the diameter of the plasma channel (2) in said furthest upstream electrode (1) in said section (6, 7, 8).

20. A plasma-spraying device as claimed in claim 2 or 19, in which, in one section (6, 7, 8), the length of the electrodes (1) in the section (6, 7, 8), which are located downstream of said furthest upstream electrode (1), is calculated as

$$Ln = n \times dchannel$$

where ln is the length of electrode n, n is the ordinal number of the electrode in a section and dchannel is the diameter of the plasma channel in said electrode n.

21. A plasma-spraying device as claimed in any one of claims 1-19, in which, at least in one section (6, 7, 8), the diameter of the plasma channel (2) varies in said section (6, 7, 8).

22. A plasma-spraying device as claimed in any one of the preceding claims, which further comprises a cathode (14) and an anode (15) arranged at a distance from the cathode (14) and coaxial therewith, between which an electric arc is generated, during use of said device, into which gas is introduced to form a plasma, said electrodes (1) being arranged between said cathode (14) and said anode (15) forming said plasma channel (2).

23. A plasma-spraying device as claimed in any one of the preceding claims, in which said electrodes (1) are annular.

24. A plasma-spraying device as claimed in any one of the preceding claims, in which said electrodes (1) are coaxially arranged.

25. A method of plasma-spraying a powdered material by using a plasma-spraying device comprising electrodes (1), which form a plasma channel (2) having an inlet end (3) and an outlet end (4), characterised in that the powdered material is supplied to the plasma-spraying device in at least one supply point located between two sections (6, 7) of said electrodes (1), which sections (6, 7) are located respectively upstream and downstream of the supply point and wherein the diameter of the plasma channel (2) is adapted in at least one section (8) to be greater than the diameter of the plasma channel (2) in each section (6, 7) located upstream of said section (8).

26. A method of plasma-spraying a powdered material by using a plasma-spraying device comprising electrodes (1), which form a plasma channel (2) having an inlet end

(3) and an outlet end (4), characterised in that the powdered material is supplied to the plasma-spraying device in at least one supply point located between two sections (6, 7) of said electrodes (1), which sections (6, 7) are located respectively upstream and downstream of the supply point and wherein at least in one section (6, 7, 8), the length of the furthest upstream electrode is adapted to equals the diameter of the plasma channel (2) in this electrode (1).

27. A method of plasma-spraying a powdered material as claimed in claim 25 or 26, in which the section (7) located downstream of the supply point is used to control the heating of the powdered material and other properties of the powder.

28. A method of plasma-spraying a powdered material as claimed in any one of claims 25-27, in which at least one of the following parameters is different between said sections (6, 7) located respectively upstream and downstream: the length of the section (6, 7), the number of electrodes (1) in the section and the geometry of the plasma channel (2) in the section (6, 7).

29. A method as claimed in any one of claims 25-28, in which a powdered material is supplied in at least two supply points located between the two sections (6, 7; 7, 8) of said electrodes (1), which sections (6, 7;7, 8) are located respectively upstream and downstream of the respective supply points.

30. Use of a device as claimed in any one of claims 1-24 for incinerating a powdered material.

31. Use of a method as claimed in any one of claims 25-29 for incinerating a powdered material.

32. Use as claimed in claim 31 of a method as claimed in any one of claims 25-29 for incinerating a powdered material, in which additional powdered material is supplied for neutralising or transforming the powdered material intended to be incinerated.

AMENDED CLAIMS

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Original claims 1-32 replaced by amended claims 1-32.

AMENDED CLAIMS

1. A plasma-spraying device for spraying a powdered material, comprising electrodes (1), which form a plasma channel (2) having an inlet end (3) and an outlet end (4), and a means (5) for supplying said powdered material to said plasma channel (2), wherein said powder supply means (5) is arranged between a first section (6) of said electrodes (1) located upstream of the means (5) and a second section (7) of said electrodes (1) located downstream of the means (5), as seen in the direction of plasma flow of the plasma channel (2) c h a r a c t e r i s e d in that the diameter of the plasma channel (2) in at least one section (8) is greater than the diameter of the plasma channel (2) in each section (6, 7) located upstream of said section (8).

2. A plasma-spraying device for spraying a powdered material, comprising electrodes (1), which form a plasma channel (2) having an inlet end (3) and an outlet end (4), and a means (5) for supplying said powdered material to said plasma channel (2), wherein said powder supply means (5) is arranged between a first section (6) of said electrodes (1) located upstream of the means (5) and a second section (7) of said electrodes (1) located downstream of the means (5), as seen in the direction of plasma flow of the plasma channel (2) c h a r a c t e r i s e d in that at least in one section (6, 7, 8), the length of the furthest upstream electrode equals the diameter of the plasma channel (2) in this electrode.

3. A plasma-spraying device as claimed in claim 1 or 2, in which at least one of the following parameters is different between said first and second sections (6, 7): the length of the section, the number of electrodes (1) in the section (6, 7) and the geometry of the plasma channel (2) in the section (6, 7).

4. A plasma-spraying device as claimed in any one of the preceding claims, in which an additional powder supply means (9) is arranged between a third section (8) of electrodes (1) and one of said first and second sections (6, 7).

5. A plasma-spraying device as claimed in any one of the preceding claims, in which a plurality of powder supply means (5, 9) are provided, each of said powder supply means (5, 9) being arranged between a section of said electrodes located upstream of the means (6, 7) and a section of said electrodes located downstream (7, 8) of the means (5, 9).

6. A plasma-spraying device as claimed in any one of the preceding claims, in which the number of electrodes (1) in at least one section (6, 7, 8) is at least two.

7. A plasma-spraying device as claimed in claim 6, in which the number of electrodes (1) in the section (6) closest to said inlet end (3) of the plasma channel (2) is at least two.

8. A plasma-spraying device as claimed in any one of the preceding claims, in which the powder supply means (5, 9) forms a space (10) for supplying powder at an angle to a centre axis of the plasma channel (2).

9. A plasma-spraying device as claimed in claim 8, in which said space (10) is formed by a projection (11) on the electrode (1) closest upstream of the means (5, 9), which is arranged at a distance from a recess (12) in the electrode (1) closest downstream of the means (5, 9).

10. A plasma-spraying device as claimed in claim 9, in which said projection (11) is conical and makes an angle ($\alpha$) with the centre axis of the plasma channel (2).

11. A plasma-spraying device as claimed in claim 10, in which said angle ($\alpha$) is 15-25°.

12. A plasma-spraying device as claimed in any one of claims 9-11, in which said recess (12) is conical and makes an angle ($\beta$) with the centre axis of the plasma channel (2).

13. A plasma-spraying device as claimed in claim 12, in which said angle ($\beta$) is 17-30°.

14. A plasma-spraying device as claimed in claims 10 and 12, in which the difference between said angle of the recess (12) and said angle of the projection (11) ($\beta$-$\alpha$) is 1.5° to 5°.

15. A plasma-spraying device as claimed in any one of the preceding claims, in which the powder supply means (5, 9) comprises openings (13) that are oriented at an angle to the centre axis of the plasma channel (2) to obtain a tangential powder supply.

16. A plasma-spraying device as claimed in any one of the preceding claims, in which the diameter of the plasma channel (2) in one section (7) is greater than the diameter of the plasma channel (2) in the section located upstream (6) of said section (7).

17. A plasma-spraying device as claimed in any of the claims 2 to 16, in which the diameter of the plasma channel (2) in at least one section (8) is greater than the diameter of the plasma channel (2) in each section (6, 7) located upstream of said section (8).

18. A plasma-spraying device as claimed in any one of the preceding claims, in which the length of the electrodes (1) is increased by their distance from the inlet end (3) of the plasma channel (2).

19. A plasma-spraying device as claimed in any of the claims 1, 3 to 18, in which, at least in one section (6, 7, 8), the length of the furthest upstream electrode (1) equals the diameter of the plasma channel (2) in said furthest upstream electrode (1) in said section (6, 7, 8).

20. A plasma-spraying device as claimed in claim 2 or 19, in which, in one section (6, 7, 8), the length of the electrodes (1) in the section (6, 7, 8), which are located downstream of said furthest upstream electrode (1), is calculated as

$Ln = n \times dchannel$

where ln is the length of electrode n, n is the ordinal number of the electrode in a section and dchannel is the diameter of the plasma channel in said electrode n.

21. A plasma-spraying device as claimed in any one of claims 1-19, in which, at least in one section (6, 7, 8), the diameter of the plasma channel (2) varies in said section (6, 7, 8).

22. A plasma-spraying device as claimed in any one of the preceding claims, which further comprises a cathode (14) and an anode (15) arranged at a distance from the cathode (14) and coaxial therewith, between which an electric arc is generated, during use of said device, into which gas is introduced to form a plasma, said electrodes (1) being arranged between said cathode (14) and said anode (15) forming said plasma channel (2).

23. A plasma-spraying device as claimed in any one of the preceding claims, in which said electrodes (1) are annular.

24. A plasma-spraying device as claimed in any one of the preceding claims, in which said electrodes (1) are coaxially arranged.

25. A method of plasma-spraying a powdered material by using a plasma-spraying device comprising electrodes (1), which form a plasma channel (2) having an inlet end (3) and an outlet end (4), c h a r a c t e r i s e d in that the powdered material is supplied to the plasma-spraying device in at least one supply point located between two sections (6, 7) of said electrodes (1), which sections (6, 7) are located respectively upstream and downstream of the supply point and wherein the diameter of the plasma channel (2) is adapted in at least one section (8) to be greater than the diameter of the plasma channel (2) in each section (6, 7) located upstream of said section (8).

26. A method of plasma-spraying a powdered material by using a plasma-spraying device comprising electrodes (1), which form a plasma channel (2) having an inlet end

(3) and an outlet end (4), c h a r a c t e r i s e d in that the powdered material is supplied to the plasma-spraying device in at least one supply point located between two sections (6, 7) of said electrodes (1), which sections (6, 7) are located respectively upstream and downstream of the supply point and wherein at least in one section (6, 7, 8), the length of the furthest upstream electrode is adapted to equals the diameter of the plasma channel (2) in this electrode (1).

27. A method of plasma-spraying a powdered material as claimed in claim 25 or 26, in which the section (7) located downstream of the supply point is used to control the heating of the powdered material and other properties of the powder.

28. A method of plasma-spraying a powdered material as claimed in any one of claims 25-27, in which at least one of the following parameters is different between said sections (6, 7) located respectively upstream and downstream: the length of the section (6, 7), the number of electrodes (1) in the section and the geometry of the plasma channel (2) in the section (6, 7).

29. A method as claimed in any one of claims 25-28, in which a powdered material is supplied in at least two supply points located between the two sections (6, 7; 7, 8) of said electrodes (1), which sections (6, 7;7, 8) are located respectively upstream and downstream of the respective supply points.

30. Use of a device as claimed in any one of claims 1-24 for incinerating a powdered material.

31. Use of a method as claimed in any one of claims 25-29 for incinerating a powdered material.

32. Use as claimed in claim 31 of a method as claimed in any one of claims 25-29 for incinerating a powdered material, in which additional powdered material is supplied for neutralising or transforming the powdered material intended to be incinerated.